

COLLEMBOLA FROM THE STATE OF WASHINGTON

BY H. B. MILLS AND A. R. ROLFS¹

The Collembola of the Pacific Coast have been studied thus far mainly by Schött (1891, 1896), Bacon (1912-1914) and Folsom (1913, 1916, 1917), although isolated species have been described by MacGillivray (1893, 1894), Canby (1926), and Mills (1931, 1932).

In this paper is included a rather comprehensive list of species collected at and about Yakima, together with a few collections from Western Washington, and scattered references in the literature to collections in the state.

The list, we believe, is quite representative. However, species of certain genera (*Orchesella*, *Sira*) are conspicuous in their absence. One should look for others of Bacon's and Schött's species described from California, and several additions to the list should result from collections between tide marks on the coast.

A number of species seem to be typical of and restricted to the west coast. Other cosmopolitan forms (*Entomobrya multifasciata* Tull. and *Achorutes armatus* Nic.) are abundantly represented here as they are in any extensive collection.

We have been very kindly allowed to examine Dr. Folsom's forthcoming monograph of the Isotomidæ of North America, and a number of determinations have been made from his manuscript.

A total of 63 species and varieties distributed in 23 genera are recorded.

Order COLLEMBOLA Lubbock

Subfamily PODURINÆ Börner

Podura aquatica (L.) Yakima, February 23, April 19, September 6. Very abundant on surfaces of ponds; also taken under sticks and debris near water.

Subfamily ACHORUTINÆ Börner

Achorutes armatus Nic. Yakima, February 20, 21, 23, October 23. Under decaying vegetation and on soil.

¹In this paper all determinations were made by H. B. Mills and all collections by A. R. Rolfs, unless otherwise stated.

Achorutes maturus Fols. Yakima, February 19-23, March 16, 23, 24, April 5, 11, 19, August 23, October 22, November 1, 15, 18; Puyallup, October 28 (W. W. Baker). In decaying vegetation and under rocks.

Achorutes pseudarmatus Fols. Yakima, March 22; Port Orchard, October 27 (W. W. Baker). Under rocks and dung at an elevation of 3000 ft., and among decaying potatoes.

Achorutes socialis Uzel. Lake Tipsoe, October 11. Under boards and sticks near water, at an elevation of 5400 ft. This species is primarily a spring form, and its occurrence in October is interesting. The elevation at which it was taken may have some bearing on its appearance.

Xenylla baconæ Fols. Puyallup, April 25. Under leaves and moss-covered sticks.

Xenylla humicola (Fab.) Tacoma, April 26. On the surface of stale pond water. The anal spines in the specimens examined were sufficiently long to cast some doubt as to the identity of the species. They were compared with specimens of *X. humicola* from Greenland which were received from Mr. J. R. Denis, and in all points, save the length of the anal spines, they are comparable.

Xenylla maritima Tull. January 23, October 22. In greenhouse and under boards.

Willemia anophthalma Börner. Yakima, January 23. In greenhouse. This species, represented by the typical form, is here reported for the first time from North America. It is a rather widely spread humus form in Europe and England.

Willemia denisi Mills. Yakima, February 23. In leaf mould. This species is the second to be described in the genus *Willemia*. It has been recorded thus far only from Yakima.

Subfamily NEANURINÆ Börner

Friesia claviseta Axelson. Yakima, February 23. Under boards and sticks near water.

Pseudachorutes complexus (MacG.) This species was described from Washington by MacGillivray (1893).

Neanura muscorum (Temp.) Yakima, April 18, September 6, 7. In rotting wood and under damp leaves.

Neanura gigantea (Tull.) Essig (1926) records this species from

Washington. It is not represented, however, in any of the collections which we have examined from the state.

Subfamily ONYCHIURINÆ Börner

Onychiurus armatus (Tull.) Yakima, February 20. Under boards.

Onychiurus subtenuis Fols. Yakima, April 18; Puyallup, November 11 (S. E. Crumb). In and under decaying wood.

Onychiurus cocklei (Fols.) This species is recorded from Washington by Folsom (1917). It seems to be a typical western form. We have seen it from Corvallis, Oregon, and Moscow, Idaho, but it is not represented in the material studied.

Tullbergia collis Bacon. Yakima, September 7. Under stones imbedded in wet sod.

Tullbergia iowensis Mills. Yakima, January 23. In greenhouse.

Family ENTOMOBRYIDÆ Tömösváry

Subfamily ISOTOMINÆ Börner

?*Isotomodes productus* (Axels.) Linnaniemi. Yakima, April 5.

A single specimen of this genus is assigned tentatively to this species. It was accidentally destroyed before it could be completely examined, but it agrees quite well with the figures given by Linnaniemi (1912).

Folsomia diplophthalma (Axelson). Yakima, January 23; Tieton City, November 15. Under boards and leaves, and in greenhouse.

Folsomia fimetaria (L.) Yakima, January 23. In greenhouse.

Folsomia nivalis (Pack.) Lake Tipsoe, October 11. Under rocks, at an elevation of 5400 ft.

Proisotoma aquæ (Bacon). Puyallup, November 11 (S. E. Crumb).

Proisotoma decemaculata Fols. Yakima, February 21. In wet decaying wood.

Proisotoma minuta (Tull.) Yakima, January 24, February 21. Under damp leaves and in greenhouse.

Proisotoma schotti (D. T.) Yakima, January 24. In greenhouse.

Isotoma (Vertagopus) cinerea (Nic.) Puyallup, November 11 (S. E. Crumb).

Isotoma (Pseudisotoma) sensibilis Tull. Puyallup, November 11 (S. E. Crumb).

Isotoma eunotabilis Fols. Yakima, February 20-23. In decaying leaves and under boards.

Isotoma viridis Bourlet. Yakima, March 15; Tacoma, April 26; Signal Peak, July 5; Puyallup, November 11 (S. E. Crumb).

Subfamily ISOTOMURINÆ Börner

Isotomurus palustris (Müller). Yakima. January 23; Tacoma, April 26; Puyallup, January 9, 24, April 25, October 28 (W. W. Baker); November 11 (S. E. Crumb). Under logs, in soil and moss, and in greenhouse.

Isotomurus retardatus Fols. Yakima, February 23, April 19, September 6, October 22; Lake Tipsoe, October 11. Under sticks near water and on floating leaves.

Architomocerura crassicauda Denis. Yakima, April 18. Under decaying wood. The discovery of this European species in North America is of passing interest. It was not described until 1931 by Denis from material in Schäffer's collection.

Subfamily TOMOCERINÆ Börner

Tomocerus bidentatus Fols. Tieton City, November 15; Puyallup, November 11 (S. E. Crumb). Under boards and leaves.

Tomocerus flavescens flavescens Tull. Recorded from Washington by Folsom (1913).

Tomocerus flavescens americanus Schött. Yakima, March 15, September 1, 6; Puyallup, April 25, January 9 (W. W. Baker); Lake Tipsoe, October 11. Under stones, leaves and moss up to an elevation of 5400 ft.

Tomocerus flavescens arcticus Schött. Yakima, February 21, 23, March 23, April 18, October 4, 22; Puyallup, April 25, November 11 (S. E. Crumb); Mineral, January 4 (W. W. Baker). In leaf mould, decaying wood, and moss.

Tomocerus flavescens separatus Fols. Puyallup, January 6 (W. W. Baker). In moss.

Tomocerus minor Lubb. This species is recorded from Washington by Folsom (1913).

Tomocerus vulgaris Tull. Yakima, February 23, March 16, 24, April 11, 19, August 23; Puyallup, April 25. Under boards, leaves, rocks, sod, and in rotting wood.

Subfamily ENTOMOBRYINÆ Schäffer

Sinella curviseta Brook. Yakima, January 23, February 23, March 12. Taken under pots in greenhouse.

Sinella binocolata (Schött). Yakima, March 7, April 11. In termite tunnels. This species, described from California, seems to be characteristically termitophilous.

Sinella guthriei (Mills). Yakima, February 13, March 15, September 1, 6, October 20; Puyallup, April 25, November 11 (S. E. Crumb); Lake Tipsoe, October 11. Under sticks and boards, and in rotting wood. *S. guthriei* approaches the European *S. myrmecophila* (Reut.) in the number of eyes. The unguis of the former differs from the figure of Linaniemi (1912) for *S. myrmecophila* in being longer and more slender, and of different dentition.

Sinella sexocolata (Schött). Yakima, February 19, 20, April 11, 14, March 23, September 1, 23, November 1; Puyallup, April 25. Under boards, leaves, and rotting wood, and among sprouting potatoes in a cellar.

Entomobrya griseo-olivata (Pack.) Yakima, March; Puyallup, March 16, April 11, 19, September 6, 7, 20, 22, 23, 25, November 1. Under sticks, stones, leaves, decaying vegetation, codling moth bands, and swept from grass.

Entomobrya atrocincta Schött. Yakima, April 15, September 17, October 25. Under wood, loose bark, and swept in a net from grass and weeds. Specimens of this species agreeing with Schött's figures and meager description seem to be structurally identical with *E. pseudoperpulchra* Mills. It seems altogether possible that both of these species are synonymous with *E. perpulchra* (Pack.) The falcate mucro of the *perpulchra* type (Mills, 1931, p. 7) may have been an abnormality, for the species seems to agree in all other respects with *atrocincta* and *pseudoperpulchra*. A fourth species, *E. clitellaria* Guthrie, is also close to *perpulchra*; but until a more detailed study of these two can be made, it will be best to keep them separate.

Entomobrya multifasciata (Tull.) This species formed the bulk of the material examined, being represented in almost every

collection, from every locality. Its habitat varied from water-soaked pine logs to greenhouses.

Entomobrya purpurascens (Pack.) Yakima, February 23, March 16, September 6, October 22. Under boards and in leaf mould.

Entomobrya triangularis Schött. Tampico, March; Puyallup, April 25, November 11 (S. E. Crumb); Tacoma, April 26. Under boards, bark, and leaves.

Lepidocyrtus cyaneus Tull. Yakima, January 23, February 21-23, March 16, 23, April 11, 19, September 7, October 22, 23, November 15, 18; Tacoma, April 26; Puyallup, April 25. Under leaf mould, boards, dung, and in soil, rotting wood, and greenhouse.

Lepidocyrtus cyaneus cinereus Fols. Yakima, March 22. Under rocks and dung at an elevation of 3000 ft.

Pseudosinella alba (Pack.) Yakima, March 15, 22, April 5, October 25; Puyallup, April 25. Under stones and dung at an elevation of 3000 ft. Under decaying wood and boards.

Pseudosinella decemocolata (Guthrie). Yakima, April 5, 11, September 1. Under boards, decaying wood, and rocks.

Pseudosinella rolfsi Mills. Yakima, March 22. Under rocks at an elevation of 3000 ft.

Pseudosinella sexocolata Schött. January 23, February 23, March 16, April 5, 11, 19, August 23, October 22, November 1. Under boards, matted vegetation, stones, and in greenhouses.

Pseudosinella violenta (Fols.) Yakima, January 23, February 23, March 12, September 7, November 4, 15; Tieton City, November 15; Puyallup, October 28 (W. W. Baker). Under boards, leaves, and rocks; in greenhouse.

Family SMINTHURIDÆ Lubbock

Subfamily SMINTHURIDINÆ Börner

Sminthurides aquaticus (Bourlet). Yakima, April 19, September 6. On floating leaves and under decaying wood near water.

Sminthurides malmgreni (Tull.) Lake Tipsoe, October 11. Under wet boards and sticks near water. Altitude 5400 ft.

Sminthurinus elegans (Fitch). Yakima, August 23, October 22. Under boards, sticks and matted vegetation.

Sminthurinus niger (Lubbock). Yakima, April 19. Under decaying wood.

Subfamily DICYRTOMINÆ Börner

Ptenothrix maculosus (Schött). Yakima, September 6, 10, October 4; Spanway, December 31; Mineral, January 4 (W. W. Baker). Under damp leaves, boards, and moss. This species is a rather abundant and exceedingly variable one. It varies from the color form figured by Schött (1891) to a deep brownish red.

Ptenothrix olympius (MacG.) Described from Washington by MacGillivray (1894).

LITERATURE CITED

Bacon, G. A.

- 1912. Pomona College Jl. Ent., IV, pp. 841-845.
- 1913a. Jl. Ent. and Zool., V, pp. 43-46.
- 1913b. Jl. Ent. and Zool., V, p. 113.
- 1913c. Jl. Ent. and Zool., V, pp. 202-204.
- 1914a. Jl. Ent. and Zool., VI, pp. 45-47.
- 1914b. Jl. Ent. and Zool., VI, pp. 84-85.
- 1914c. Jl. Ent. and Zool., VI, pp. 137-179.

Canby, M.

- 1926. Jl. Ent. and Zool., XVIII, p. 41.

Essig, E. O.

- 1926. Insects of Western North America, pp. 58-62.

Folsom, J. W.

- 1913. Proc. U. S. Nat. Mus., XLVI, pp. 451-472.
- 1916. Proc. U. S. Nat. Mus., L, pp. 477-525.
- 1917. Proc. U. S. Nat. Mus. LIII, pp. 637-659.

Linnaniemi, W. M.

- 1912. Acta Soc. Sci. Fenn., Tom. XL, No. 5, pp. 1-361.

MacGillivray, A. D.

- 1893. Can. Ent., XXV, pp. 313-318.
- 1894. Can. Ent., XXVI, pp. 105-110.

Mills, H. B.

- 1931. Amer. Mus. Novitates, No. 464, pp. 1-11.
- 1932. Iowa State College Jl. Sci., VI, pp. 263-276.

Schött, Harald

- 1891. Bih. Till K. Sven. Vet. Akad. Handl., Band XVII, Afd. 4, No. 8, pp. 1-25.
- 1896. Proc. Cal. Acad. Sci., 2nd Ser., VI, pp. 169-196.